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D Nash 8/14/02

CLAIMS

What is claimed is:

1. (Amended) An apparatus for changing the speed of a bicycle having a rear driving wheel, the apparatus comprising:

a driven sprocket for receiving the driving force of a driving sprocket;

a speed controlling portion, comprising:

a carrier fixed to one side of the driven sprocket, a plurality of planetary gears within said carrier, each of said planetary gears ~~having ratchet teeth along the inner circumference thereof~~ having at least a first tooth portion and a second tooth portion;

at least two sun gears, each having ratchet-teeth along its inner circumference, ~~engageable with each of the planetary gears~~ ins B1;

a ring gear engageable with ~~the outer circumferences of~~ the planetary gears;

an output portion, comprising:

a hub shell for transferring the driving force to the rear wheel of the bicycle by means of the carrier and the ring gear;

a clutch means, mounted between the carrier and hub shell and the ring gear and the hub shell to selectively mediate the driving force; and

a speed-change controlling portion, comprising:

a hub shaft having a pawl-positioning portion;

at least two sets of pawls engageable with and releasable from the ratchet-teeth of the sun gears;

a pawl-controlling ring for controlling the position of the pawls;

a transforming disk having a groove along its outer circumference, and a hooking portion on said outer circumference, said hooking portion adapted to transform the position of the pawl-controlling ring through a mediating portion;

a spring for restoring the position of the transforming disk to its original position; and

a spacing portion enabling the transforming disk to rotate freely.

2. (Amended) The apparatus of claim 1, wherein on the inner surface of the pawl-controlling ring, grooves are positioned symmetrically with respect to the center point.

3. (Amended) The apparatus of claim 2, wherein the grooves of the pawl-controlling ring are not positioned at a uniform angular interval with respect to the center point of the pawl-controlling ring.

4. (Amended) The apparatus of claim 2, wherein the grooves comprise a pair of sloping grooves and a pair of angular grooves, the sloping groves alternating with the respective angular grooves.

5. (Amended) The apparatus of claim 1, wherein the pawls are positioned in the pawl-positioning portion of the hub shaft at a uniform angular interval.

6. (Amended) The apparatus of claim 1, wherein each of the pawls comprises:

a sag portion positioned inside of the pawl-controlling ring; and

a stopper portion engageable with and releasable from the ratchet-teeth at the inner circumference of the sun gear.

7. (Amended) The apparatus of claim 6, wherein those pawls positioned relatively far from the pawl-controlling ring further comprise an extended portion that is thinner than the pawl bodies.

8. (Amended) The apparatus of claim 1, wherein the mediating portion comprises:

a splined groove on one side of the pawl-controlling ring;

a connecting portion having a coupling groove, said connecting portion engaging the splined groove; and

a pork ring in the coupling groove, mediating the rotational force by engaging a splined portion of the transforming disk.

9. (Amended) The apparatus of claim 1, wherein the spacing portion comprises:

a sustaining portion sustaining a bear ring, which is mounted between the carrier and the sustaining portion;

a fixed disk that is fixed to the hub shaft; and

a plurality of spacer pins that are fixed to the fixed disk and in contact with the sustaining portion through an arc groove in the transforming disk.

10. (Amended) The apparatus of claim 9, wherein the sustaining portion is rotatable, and a passage hole is provided therein.

11. (Amended) The apparatus of claim 1, comprising more than two set of pawls, a plurality of pawl-controlling rings provided between each set of pawls.

12. (Amended) The apparatus of claim 1, wherein the clutch means comprises:

a clutch ring having a group of pins positioned therein; and

a sloping portion at the outer circumference of the carrier and the ring gear.

13. (Amended) The apparatus of claim 1, wherein the clutch means comprises:

a first pawl in the space between the planetary gears; and

a ring gear portion at the inner circumference of the hub shell.

14. (Amended) The apparatus of claim 1, wherein the clutch means comprises:

a second pawl installed in the space between the planetary gears;

a ring gear outside the second pawl simultaneously engaging the planetary gears and the second pawl; and

a third pawl between the ring gear and the hub shell.

15. (Amended) The apparatus of claim 1, wherein the mediating portion comprises:

a pin fixed on one side of the pawl-controlling ring, said pin connected to the transforming disk through a disk positioned between the pawl-controlling ring and the transforming disk.